

PREGNANCY COMPLICATED BY RHEUMATIC HEART DISEASE*

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PREGNANCY complicated by heart disease is a grave condition for both mother and child. The maternal mortality is high and premature birth is frequent. In our experience at the Toronto General Hospital the maternal mortality has varied, in previously reported cases, from 8.4 to 2.3 per cent. Eastman¹ estimates the maternal mortality at 8 to 5 per cent, and states that on that basis 1,000 women die annually in the United States from heart disease complicating pregnancy. An even more dramatic emphasis of the seriousness of this complication of pregnancy is made by Hamilton and Kellogg,² who state that 20 per cent of the maternal deaths at the Boston Lying-In Hospital over a period of four years were due to heart disease. W. Schuman³ states that the second highest cause of maternal mortality at the Sinai Hospital, Baltimore is cardiac disease.

In 1933 the writer in conjunction with Prof. W. A. Scott⁴ reported on a series of patients suffering from rheumatic heart disease and pregnancy delivered at the Toronto General Hospital. The problem of myocardial disease and pregnancy was considered in various aspects and certain general conclusions were drawn. Two of the conclusions resulted in broad changes of policy at our clinic in regard to the observation and management of the pregnant patient with heart disease. The first led to the establishment of a combined prenatal and cardiac clinic which has permitted personal consultations between cardiologist and obstetrician and a continuity of observation of all heart cases by one obstetrician and cardiologist. As far as practicable all labours are conducted by the same obstetrician. The second conclusion led to a radical change in the methods of delivery. In the series reported in 1933 Cæsarean section was the method of delivery in 46.3 per cent of the cases. We concluded that this high incidence of Cæsarean section was unwarranted and should be reduced.

The purpose of this paper is to give our present opinions in regard to heart disease and pregnancy,

and to report a new series of 35 deliveries. Included also, is a report of 11 pregnancies terminated because of rheumatic heart disease.

During the past three years 35 patients suffering from rheumatic heart disease and pregnancy have attended the combined prenatal cardiac clinic at the Toronto General Hospital. These patients have been divided into three groups according to the severity of their heart disease and are very similar in comparison to the cases previously reported in 1933. Table I presents

TABLE I.
SEVERITY OF THE HEART DISEASE

	<i>Previous Series 41 Cases Primiparæ 15 Multiparæ 26</i>	<i>Present Series 35 Cases Primiparæ 15 Multiparæ 20</i>
Slight or no impairment of exercise tolerance...	16 cases	15 cases
Moderate to severe impairment of exercise tolerance.....	16 cases	14 cases
Failure.....	9 cases	6 cases
Total.....	41 cases	35 cases

such a grouping and comparison of the two series. Group 1 includes those patients with no or only slight impairment of exercise tolerance. Group 2 includes those with moderate to severe impairment of exercise tolerance, and Group 3 includes those who had cardiac failure. The patients were classified after delivery and many who would have been in Group 1 early in pregnancy were finally classified in Group 2. All patients who developed failure did so after the fourth month.

The methods of delivery for the two series of cases are shown in Table II. The incidence of spontaneous births is practically the same for

TABLE II.
METHOD OF DELIVERY

<i>Type of Delivery</i>	<i>Previous Series 41 Cases</i>	<i>Present Series 35 Cases</i>
Spontaneous.....	39.0% (16 cases)	45.7% (16 cases)
Forceps.....	14.6% (6 cases)	51.5% (18 cases)
Cæsarean section and sterilization..	46.3% (19 cases)	2.8% (1 case)

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both series. The great difference occurs in the incidence of forceps deliveries and Cæsarean section. Forceps were employed nearly four and a half times as frequently in the second group as in the first, while the incidence of Cæsarean section was reduced from 46 to 2.8 per cent. Both series of cases are small, nevertheless they show that practically identical results were obtained in similar cases by conservative as compared with radical methods of delivery. It seems reasonable to suppose that the constant employment of a serious abdominal operation in a larger number of cases would lead to a higher mortality than would simple forceps delivery.

There was one death from heart failure in both series. In the first series the death occurred twenty-four hours after a forceps delivery, while in the second series the death occurred twenty-seven days after induced labour and spontaneous delivery.

The complications of labour are shown in Table III. Premature birth occurred 7 times,

TABLE III.
COMPLICATIONS OF LABOUR

<i>Complication</i>	<i>No. of Cases</i>	<i>Primiparæ</i>	<i>Multiparæ</i>
Premature births.....	7	3	4
Post-partum hæmorrhage	1	0	1
Excessive post-partum bleeding.....	4	2	2

Average duration of labour in primiparæ, 18 hours.

or in 20 per cent of the cases, which is characteristic of pregnancy complicated by heart disease. The constant danger of post-partum hæmorrhage in the cardiac patient is emphasized by one case of severe post-partum hæmorrhage and 4 cases of excessive post-partum bleeding. The average duration of the first stage of labour in primiparæ, 18 hours, is mentioned as it is usually stated that labour is rapid in the patient suffering from heart disease.

In our experience over 90 per cent of heart disease complicating pregnancy is rheumatic in origin. The most common valvular lesions are mitral stenosis and insufficiency, although aortic insufficiency is not unusual. The diagnosis of heart disease and the estimation of the ability of the heart to stand the added strain of pregnancy are both frequently difficult. The large hypertrophied breasts of pregnancy interfere with the percussion of the heart borders, and the raised diaphragm, which occurs fairly early in

pregnancy, results in the rotation of the apex of the heart outwards, further adding to the difficulty of estimating the degree of cardiac hypertrophy. The murmurs also frequently change as the pregnancy progresses. It is not unusual to find at one examination a definite mitral diastolic murmur, only to discover that it has disappeared when the patient is next examined. Shortness of breath and dependent œdema, common symptoms of heart disease, are frequent accompaniments of normal pregnancy, particularly during the later months. These difficulties of diagnosis are all minimized in the early months of pregnancy, and are further evidence of the value of early prenatal examination and observation.

More than usual care should be taken in the routine heart examination of the pregnant patient or many cases of heart disease will be missed. A large percentage of patients suffering from this complication of pregnancy have no symptoms of heart disease (15 out of 35 in the present series), and hence nothing to direct attention to careful examination of the heart. An enquiry in regard to past attacks of rheumatic fever or chorea should be a routine question, and when such a history is elicited particular care should be exercised in the examination of the heart.

The progressive nature of rheumatic heart disease warrants particular emphasis when considered in relationship to pregnancy. A patient, 20 years of age, suffering from rheumatic heart disease may withstand the strain of pregnancy and labour without cardiac embarrassment, yet a few years later pregnancy may result in failure and death. In other words, the history of uneventful past pregnancies is no indication that a subsequent pregnancy will not cause a cardiac breakdown. In a previously reported series of 10 patients⁴ who developed failure during pregnancy, 7 were multiparæ who had experienced relatively normal pregnancies up to the one causing the cardiac breakdown.

MANAGEMENT OF THE PREGNANT PATIENT WITH HEART DISEASE

The management of the pregnant patient suffering from heart disease can be conveniently discussed under three headings:—The management during the prenatal period, during labour, and during the puerperium.

Management during the prenatal period.—The first requisite here is frequent observation. The value of such prenatal examination is particu-

larly well emphasized by Lamb⁵, who reports a 2.2 per cent mortality where adequate prenatal care was carried out, compared with a 20 per cent mortality in patients who did not receive prenatal observation. The observation must be frequent. Our procedure is to have the patient visit the clinic twice a month until the eighth month, and each week from then on. We advise admission to hospital seven to ten days before the expected date of confinement for rest and observation. The reason for such frequent observation is to discover early cases that are developing progressive impairment of exercise tolerance or impending failure. Once cardiac insufficiency has occurred, the maternal mortality is more than doubled, and if labour occurs during failure the mortality is about 50 per cent.

Special advice should be given in regard to hours of rest. The physiological strain of pregnancy on the heart can best be compensated for by increased rest and limitation of exercise. Fourteen hours a day in bed are necessary for all cases, and this should be increased as the pregnancy progresses or if the patient is unusually dyspnoeic. At the earliest sign of cardiac failure absolute rest in bed is necessary.

The physiological gain in weight during pregnancy is an added burden to the heart and should be controlled by suitable restrictions in diet. If the patient is obese efforts should be made to prevent any gain in weight, and in the co-operative patient an actual reduction in weight may be obtained.

The importance of avoiding intercurrent respiratory infection should be stressed, and when slight colds occur the patient should remain in bed.

The occurrence of signs or symptoms of the late toxæmias of pregnancy warrant hospital treatment. J. Corwin *et al.*⁶ have reported an increased incidence of toxæmia in the pregnant patient suffering from heart disease, but this has not been our experience. However, the occurrence of even mild degrees of hypertension and albuminuria should be viewed with alarm.

Management during Labour.—The occurrence of labour in the patient suffering from heart disease may be looked upon as a final test of the diseased myocardium, yet it need not be unduly feared. If a patient goes through pregnancy without developing cardiac insufficiency then she is very unlikely to develop it as result of normal labour. It is often amazing how well a patient stands a prolonged first stage of labour

without cardiac embarrassment. Cæsarean section has been advocated for a number of years as a method of delivery to relieve the heart from the strain of labour. While the incidence of Cæsarean section has been markedly reduced in our clinic we do feel that it has definite, if restricted, indications, in cases of heart disease. It is justified in patients who have serious myocardial damage and where long or difficult labour is anticipated with increased risk to the baby. The type of Cæsarean section performed depends to a great extent on the degree of circulatory embarrassment that is present. Classical Cæsarean section can be performed with the patient flat on the table or with the shoulders raised. This position is preferable to the Trendelenberg position required for the low Cæsarean. If, however, there is little circulatory embarrassment and the patient is not dyspnoeic, the low section, because of greater safety and less post-operative distension, should be employed. Sterilization should be done at the time of operation.

During the first stage of labour the chief attention should be directed to the relief of pain and anxiety and the promotion of relaxation and rest. Heroin in twelfth of a grain doses, in our experience, has proved the most satisfactory sedative. Morphine and hyoscine are not used because of their occasional exciting effect. In the more prolonged labour adequate intake of fluids and carbohydrates is important to prevent acidosis.

The exhausting expulsive efforts of the second stage of labour should be eliminated by the use of forceps in the full-term deliveries, and episiotomy alone when the child is premature. The anæsthetic of choice is ether combined with oxygen to prevent cyanosis.

Premature labour is a common occurrence and the incidence of excessive post-partum bleeding and hæmorrhage is definitely increased. Sudden collapse after delivery may occur. This should be anticipated by the application of a tight abdominal binder with pad after delivery and the early return of the patient to bed in the Fowler position.

Management during the Puerperium.—The cardiac patient requires close observation during the puerperium, as frequently two to three days after delivery a period of exhaustion occurs and the patient appears more ill than at any time during the pregnancy. The average patient requires three weeks in bed and the more severe cases, a correspondingly longer time. There is no

reason, if the patient is not too exhausted, why she should not nurse her baby.

THE TERMINATION OF PREGNANCY

A discussion of pregnancy complicated by heart disease would be incomplete without considering the indications for the termination of pregnancy. During the past five years, at the Toronto General Hospital, 11 patients have had their pregnancies terminated because of rheumatic heart disease. The indications for termination are shown in Table IV and require little

TABLE IV.

INDICATIONS FOR TERMINATION OF PREGNANCY
11 CASES

Indication	No. of Cases	Primiparae	Multiparae
Impending failure.....	4	0	4
Failure before or during pregnancy.....	6	1	5
Toxic vomiting plus heart disease.....	1	0	1
Total.....	11	1	10

comment. The four patients who had their pregnancies terminated for impending failure were all multiparae who, despite hospital treatment, failed to improve sufficiently to warrant the risk of carrying the pregnancy to the period of viability. The history of previous myocardial failure or the occurrence of failure during pregnancy were the indications for termination in six cases. One patient had her pregnancy terminated because of the added complication of pernicious vomiting.

Just as it is impossible to lay down positive dogmatic rules for the management of the pregnant patient suffering from heart disease so it is impossible to be positive as to all indications for the termination of pregnancy. Termination of pregnancy is indicated in any patient who has had myocardial failure before becoming pregnant. There is no reason to believe that a heart which has already failed will stand the added strain of pregnancy. The occurrence of myocardial failure during pregnancy is also an indication for termination, but only after recovery from the failure has occurred. Operative interference with pregnancy during failure is almost uniformly fatal. However, once recovery from failure has occurred the pregnancy should be terminated, as the progressive embarrassment of the heart caused by the growing pregnancy may cause another

and fatal attack of cardiac insufficiency. A slight delay in termination, however, is indicated if the pregnancy is close to the period of viability.

A number of patients will, early in pregnancy, develop increasing impairment of their exercise tolerance, often to a marked degree. A certain number of these require termination, and it is in this type of case that the judgment of both cardiologist and obstetrician experienced in the problem of heart disease and pregnancy is of particular value. The parity of the patient presenting such a picture is an influencing factor in arriving at a decision for termination. With the primiparous patient anxious to have a baby an effort should be made to carry the pregnancy to the period of viability. The multipara, the mother of young children, is a very important member of the home and community, and more radical recommendations are justified. Similarly, the amount of rest a patient can obtain during pregnancy is an important factor. This depends on the size of her family, household duties, responsibilities and her ability to cooperate.

The method of termination of the pregnancy depends largely on two factors, first, the severity of the heart disease, and, second, the duration of the pregnancy at the time of operation. Table V shows the methods used in the present

TABLE V.

METHODS OF TERMINATION OF PREGNANCY
11 CASES

Method	No. of Cases	Duration of Pregnancy	Results
Dilatation and curettage.....	2	under 3 months	satisfactory
Supravaginal hysterectomy.....	7	4 to 6 months	"
Abdominal hysterectomy and sterilization.....	1	3 months	"
Bag induction.....	1	4 months	"
Total.....	11		

series of 11 cases. The operation of choice is one that combines termination and sterilization with the minimum of shock and disturbance to the patient. In our experience supravaginal hysterectomy has met these requirements with considerable success when the pregnancy is between four and six months. As many patients with heart disease eventually develop menorrhagia removal of the uterus is of prophylactic value. Early in pregnancy dilatation and curettage is a relatively easy and non-shocking oper-

ation, and while sterilization is not accomplished, it is nevertheless, the operation of choice. Abdominal hysterotomy and sterilization conserves the uterus, which is of doubtful value in these cases, but, according to M. Stutz,⁷ of the Zurich Women's Clinic, is followed by an incidence of fatal pulmonary embolism thirty times as great as that after full-term delivery. In severe cases of heart disease on the verge of failure, where any operative procedure is hazardous, the introduction of a hydrostatic bag to induce labour is a conservative procedure.

The question of future pregnancy for the patient with rheumatic heart disease must be carefully considered. The intelligence and the ability of the patient to cooperate will determine whether sterilization or only contraceptive advice is necessary. Patients who have had failure or who have moderate impairment of exercise tolerance should be advised against further pregnancies. For the group of patients who have no symptoms or only slight impairment of exercise tolerance, the deciding factor is frequently the economic status of the patient. The higher incidence of myocardial failure developing during pregnancy in a group of public-ward patients compared with a private group has already been mentioned. This difference can be partly explained by the increased rest, greater comfort of home life, and freedom from worry that the private patient as a rule enjoys. Many factors have to be considered, not the least of which is the parents' own view on the matter. It is only fair to the patient to point out the added risk she faces in a contemplated pregnancy, which can be conservatively stated at five times the normal.² We do not believe that sterilization is an indication for Cæsarean section. It can be performed with less risk to the patient when she is not pregnant. Vaginal sterilization is preferable in most cases.

It has not yet been definitely shown that

pregnancy *per se* shortens the life of a group of patients suffering from heart disease. The added responsibilities and increased work associated with the care of young children in the home may be of equal importance. Our impression however is in agreement with the conclusion of Gilchrist and Murray-Lyon⁸ that repeated pregnancies tend to shorten life and increase the risk of death from cardiac failure.

CONCLUSIONS

1. Rheumatic heart disease is a serious complication of pregnancy.
2. Prenatal observation by cardiologist and obstetrician is necessary for the proper management of these cases. The aim of prenatal management is to anticipate and prevent cardiac failure.
3. If cardiac failure does not occur during pregnancy it is very unlikely to develop as a result of normal labour.
4. The employment of conservative methods of delivery in rheumatic heart cases is recommended, while the indications for Cæsarean section are limited.
5. For the majority of patients further pregnancies are inadvisable and termination of pregnancy is frequently justified because of rheumatic heart disease.

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GONORRHOEAL VAGINITIS: RESULTS OF TREATMENT WITH DIFFERENT PREPARATIONS AND AMOUNTS OF ESTROGENIC SUBSTANCE.—In treating gonorrhoeal vaginitis, R. M. Lewis and Eleanor L. Adler found that oestrogenic substance in ethylene glycol given hypodermically was relatively effective when used in large doses; 2,400 international units daily. Eight hundred international units daily proved disappointing. The use of vaginal oestrogenic suppositories (originally 600 international units and later 1,000) proved very effective. Clinical improvement, cessation or great diminution of discharge is nearly always noted after from fourteen to eighteen days of treatment. The administration of oestrogenic substance changes the reaction of the vaginal

secretions from neutral or alkaline to acid. This, the authors believe, is the major factor in eliminating the gonococcal infection. The acidity of the vaginal secretions is easily measured and provides a sure guide by which one can determine whether or not dosage is adequate. Of thirty-three consecutive cases of gonorrhoeal vaginitis in children treated with oestrogenic suppositories, thirty yielded negative smears in an average of 20.7 days. Two required twelve weeks of treatment. Five cases are listed as recurrences. No ill effects were encountered. The method is safe and harmless, and the most effective method known for the treatment of gonorrhoeal vaginitis in children.—*J. Am. M. Ass.*, 1936, 106.